

CLAIMS

Sub B17

1. A digital communications device for optimally correcting transmission path characteristics containing noise transmitted from a plurality of half-duplex communication devices via a half-duplex transmission path, said device comprising:

5 a NEXT noise coefficient table, in which are stored equalizing coefficients of equalizers for optimally correcting characteristics of a transmission path containing a NEXT noise transmitted from a near-end half-duplex communication device that is on side near to a main device among said plurality of half-duplex communication devices;

10 a FEXT noise coefficient table, in which are stored equalizing coefficients of equalizers to optimally correct characteristics of a transmission path containing a FEXT noise transmitted from a far-end half-duplex communication device that is on side far from the main device among said plurality of half-duplex communication devices; and

15 equalizers for correcting transmission path characteristics based on the equalizing coefficients in the NEXT noise coefficient table when the FEXT noise has been transmitted from said near-end half-duplex communication device, and on the other hand, for correcting transmission path characteristics based on the equalizing coefficients in the FEXT noise coefficient table when the FEXT noise has been

20

25

03443293.12039

transmitted from said far-end half-duplex communication device.

2. The digital communication device according to claim 1,
5 wherein said digital communication device is a terminal end
device for transmitting after synchronizing communication
between said half-duplex communication devices, and when the
NEXT noise has been transmitted from said near-end half-duplex
communication device on a terminal end while data is travelling
10 upstream on said half-duplex transmission path from a terminal
end to a central office end, the transmission path
characteristics are corrected based on equalizing coefficients
in said NEXT noise coefficient table applied to said equalizers,
and, on the other hand, when the FEXT noise has been transmitted
15 from said far-end half-duplex communication device on the
central office end while data is travelling downstream on the
half-duplex transmission path from the central office end to
the terminal end, the transmission path characteristics are
corrected based on equalizing coefficients in said FEXT noise
20 coefficient table applied to said equalizers.

3. The digital communication device according to claim 1,
wherein said digital communication device is a central office
end device for transmitting after synchronizing communication
25 between said half-duplex communication devices, and when the

NEXT noise has been transmitted from said near-end half-duplex communication device on the central office end while data is travelling downstream on said half-duplex transmission path from a central office end to a terminal end, the transmission path characteristics are corrected based on equalizing coefficients in said NEXT noise coefficient table applied to said equalizers, and, on the other hand, when the FEXT noise has been transmitted from said far-end half-duplex communication device on the terminal end while data is travelling upstream on said half-duplex transmission path from the terminal end to the central office end, the transmission path characteristics are corrected based on equalizing coefficients in said FEXT noise coefficient table applied to said equalizers.

4. The digital communication device according to claim 1 further comprising,

a detecting and determining section for detecting the noise transmitted from said half-duplex communication device, and determining whether it is the NEXT noise or the FEXT noise; wherein,

based on a determination output from said detecting and determining section, in the case of the NEXT noise, the equalizers correct the transmission path characteristics based on equalizing coefficient from said NEXT noise coefficient

table, and in the case of the FEXT noise, said equalizers correct the transmission path characteristics based on equalizing coefficient from said FEXT noise coefficient table.

5 5. The digital communication device according to claim 1, wherein prior to communication, it determines filter coefficients to converge the transmission functions of the noise, using predetermined data in frames transmitted between said plurality of half-duplex communication devices, the data
10 having a pre-identified pattern and generation timing, and at transmission, it creates a replica of the predetermined data affected by the noise using the converged filter coefficient during the generation timing of the predetermined data, and subtracts the replica from the received signal.

15 6. The digital communication device according to claim 1, wherein said half-duplex transmission path is a TCM-ISDN transmission path, said plurality of half-duplex communication devices transmit TCM-ISDN communication via said TCM-ISDN
20 transmission path, and said main device transmits ADSL communication via an ADSL transmission path.

Sub 027
25 A digital communication device for optimally correcting, when receiving data, characteristics of a transmission path containing noise transmitted from a plurality of half-duplex

communication devices transmitting via half-duplex transmission paths; said device comprising:

a FEXT noise coefficient table, in which are stored equalizing coefficients of equalizers to optimally correct characteristics of a transmission path containing a FEXT noise transmitted from a far-end half-duplex communication device that is on side far from a main device among said plurality of half-duplex communication devices; and

equalizers for correcting transmission path characteristics based on equalizing coefficient in said FEXT noise coefficient table when a NEXT noise has been transmitted from a near-end half-duplex communication device, being one of said plurality of half-duplex communication devices, which is near to the main device, and when the FEXT noise has been transmitted from said far-end half-duplex communication device.

8. The digital communication device according to claim 7, wherein said digital communication device is a terminal end device for transmitting after synchronizing communications between said half-duplex communication devices, and when the NEXT noise has been transmitted from said near-end half-duplex communication device on a terminal end while data is travelling upstream on said half-duplex transmission path from a terminal end to a central office end, it corrects transmission path

characteristics based on equalizing coefficients in said FEXT noise coefficient table applied to said equalizers, and, on the other hand, when the FEXT noise has been transmitted from said far-end half-duplex communication device on the central office end while data is travelling downstream on the half-duplex transmission path from the central office end to the terminal end, said device corrects the transmission path characteristics based on equalizing coefficients in said FEXT noise coefficient table applied to said equalizers.

9. The digital communication device according to claim 7, wherein said digital communication device is a central office end device for transmitting after synchronizing communications between said half-duplex communication devices, and when the NEXT noise has been transmitted from said near-end half-duplex communication device on the central office end while data is travelling downstream on said half-duplex transmission path from a central office end to a terminal end, said device corrects transmission path characteristics based on equalizing coefficients in said FEXT noise coefficient table applied to said equalizers, and, on the other hand, when the FEXT noise has been transmitted from a far-end half-duplex communication device on the terminal end while data is travelling upstream on said half-duplex transmission path from the terminal end to the central office end, the device corrects transmission path

characteristics containing the FEXT noise based on equalizing coefficients in said FEXT noise coefficient table applied to said equalizers.

5 10. The digital communication device according to claim 7 further comprising a detecting and determining section for detecting the noise transmitted from said half-duplex communication device, and determining whether it is the NEXT noise or the FEXT noise; wherein,

10 based on a determination output from said detecting and determining section, said equalizers optimally correct the transmission path characteristics based on equalizing coefficient from said FEXT noise coefficient table in the case of said NEXT noise and also in the case of FEXT noise.

15

Sub 237 11. A digital communication device for optimally correcting, when receiving data, characteristics of a transmission path containing noise transmitted from a plurality of half-duplex communication devices transmitting via half-duplex
20 transmission paths; said device comprising:

a FEXT noise coefficient table, in which are stored equalizing coefficients of equalizers to optimally correct characteristics of a transmission path containing FEXT noise transmitted from a far-end half-duplex communication device
25 that is on side far from a main device among said plurality of

half-duplex communication devices;

equalizers for correcting transmission path characteristics containing said FEXT noise based on equalizing coefficient in said FEXT noise coefficient table; and

5 the device receiving data only while said FEXT noise is being transmitted.

12. The digital communication device according to claim 11, wherein said digital communication device is a terminal end
10 device for transmitting after synchronizing communications between said half-duplex communication devices, and during a period when the NEXT noise is transmitted from said near-end half-duplex communication device on a terminal end while data is travelling upstream on said half-duplex transmission path
15 from a terminal end to a central office end, the device does not receive data, and, on the other hand, during a period when the FEXT noise is transmitted from the far-end half-duplex communication device on the central office end while data is travelling downstream on the half-duplex transmission path from
20 said central office end to the terminal end, said device receives a data transmission, and in addition, optimally corrects the transmission path characteristics containing the FEXT noise based on equalizing coefficients in said FEXT noise coefficient table applied to said equalizers.

13. The digital communication device according to claim 11,
wherein said digital communication device is a central office
end device for transmitting after synchronizing communications
between said half-duplex communication devices, and during a
5 period when the NEXT noise is transmitted from said near-end
half-duplex communication device on the central office end
while data is travelling downstream on said half-duplex
transmission path from a central office end to a terminal end,
said device does not receive data, and on the other hand, during
10 a period when the FEXT noise is transmitted from said far-end
half-duplex communication device on the terminal end while data
is travelling upstream on said half-duplex transmission path
from the terminal end to the central office end, said device
receives data, and in addition, corrects transmission path
15 characteristics containing the FEXT noise based on equalizing
coefficients in said FEXT noise coefficient table applied to
said equalizers.

14. The digital communication device according to claim 11
20 further comprising,

a detecting and determining section for detecting the
noise transmitted from said half-duplex communication device,
and determining whether it is in a FEXT noise domain; wherein,

based on a determination output from said detecting and
25 determining section, in the case of the FEXT noise, said

equalizers optimally correct the transmission path characteristics based on equalizing coefficient from said FEXT noise coefficient table.

Add B47

65027 8523460